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United States Department of Agriculture,
BUREAU OF PLANT INDUSTRY,
Seed and Plant Introduction and Distribution,
WASHINGTON, D. C.

DISTRIBUTION OF CENTERVILLE SEA ISLAND
COTTON SEED.

The Department of Agriculture has continued the work of selecting wilt-resistant varieties of cotton, and it is believed that in the Centerville Sea Island cotton seed distributed in 1905 the Department has secured a variety that will be especially adapted to the mainland districts of Georgia and Florida.

The accompanying paper, giving a history of the variety, with a description of the wilt disease and instructions for selecting seed, has been prepared by Mr. W. A. Orton, who is in charge of this branch of the work.

A. J. PIETERS,
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Approved:

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Chief of Bureau.

WASHINGTON, D. C., *February 11, 1905.*

CENTERVILLE SEA ISLAND COTTON.

HISTORY.

The Centerville Sea Island cotton is a variety bred by the Department of Agriculture for resistance to the wilt disease, or "black-root," and designed especially for distribution in Georgia and Florida. The object in view in developing it was to combine with wilt resistance greater productiveness and general hardiness rather than exceptionally long staple. This ideal has not been fully attained, but the variety is considered worthy of introduction and experimental trial.

The first selection was made from a wilt-infected field on Edisto Island, South Carolina, in 1900. The strain was cultivated and selected for wilt resistance for several years as Series No. 104. In 1902, Mr. E. L. Rivers grew this cotton for the Department of Agriculture and selected seed from several individual plants. This was grown in 1903 as Series No. 161 on infected land on James Island, South Carolina. The progeny of one of these plants showed such marked excellence that it was preserved and became the parent of the strain now introduced as "Centerville," which is the name of Mr. Rivers' plantation. The seed distributed with this circular was grown for the Department by Mr. W. G. Hinson, James Island, South Carolina.

CHARACTERS.

Plant medium size, compact; wilt-resistant, very productive; bolls small, blunt; lint medium fine, $1\frac{7}{8}$ inches long; per cent of lint 30 in 1904.

DIRECTIONS FOR PLANTING.

Since only a small quantity of seed can be had, unusual care ought to be taken in planting to make it go as far as possible. One acre can be planted with a peck of seed by dropping by hand three seeds in a hill. Cover lightly and thin out to one plant in a place.

In land of ordinary fertility plant in rows 4 feet apart, with the plants 18 inches apart in the row. In rich soil make the rows 5 feet apart, with 20 to 22 inches between the plants.

To fully test the resistant qualities of the Centerville cotton, this seed should be planted on wilt-infected land, but it is not necessary to use infected land to maintain the resistance of the variety. To secure the best results, plow deep, prepare the land thoroughly, and use 400 to 600 pounds per acre of commercial fertilizer or its equivalent in stable manure or compost. Cultivate well and frequently. On the Sea Islands the cotton is grown on high beds and the soil drawn up around the plants in cultivating. Level culture is recommended for Georgia and Florida, however, except on poorly drained land.

DESCRIPTION OF COTTON WILT.

The disease known as wilt is also called "blight" and "black-root." It is injurious to Sea Island cotton on the Sea Islands of South Carolina, and in southern Georgia and in Florida, and to Upland cotton over wide areas in several States. It is worse on sandy soils, where it persists year after year. Prominent symptoms are the wilting of the plants, which are dwarfed or killed, the brown discoloration of the inner wood of stem and root, and a tufting of the small rootlets.

The wilt is caused by a parasitic fungus (*Neocosmospora vasinfecta* (Atk.) Erw. Sm.) in the soil, which enters the roots and grows upward through the water-carrying vessels of the stems, which it clogs. It is aggravated by continuous cropping in cotton, but can not be remedied by rest or rotation, since the fungus can live in the soil for an indefinite time after it has once obtained a foothold. It is not due to the poverty of the land nor to the use of commercial fertilizers, and can not so far as known be cured by adding any fertilizer or other substance to the soil.

CONTROL.

The only remedy is the use of resistant varieties. Since the fungus does not attack any other crop except okra, when land is badly affected by wilt and seed of resistant cotton can not be had some crop other than cotton should be planted.

Although a rotation of crops will not entirely rid land of the cotton wilt after it has become badly infected, the practice should be strongly urged in connection with the use of resistant varieties, as a suitable rotation will do much to prevent the wilt disease from becoming established in any land. Most southern soils are deficient in vegetable matter, and this condition is aggravated by continuous cotton growing, the effect on the plant being seen in the decreased yield and greater tendency to rust. The planting of legumes, such as cowpeas, velvet beans, ground peas, soy beans, beggarweed, crimson clover, hairy vetch, etc., corrects this trouble by the addition of vegetable matter to the soil, while at the same time these plants draw nitrogen from the air and lessen the need for commercial fertilizers. A rotation should also provide for a winter cover crop to prevent loss of plant food by washing and leaching. The best succession of crops must be determined by the individual farmer, but the following is suggested: (1) Corn with cowpeas; (2) oats, followed by cowpeas; (3) cotton. Other combinations of legumes that may be used in rotation with cotton are: (1) Corn with ground peas; (2) beggarweed, cut twice for hay; (3) oats with hairy vetch, pastured in the winter and cut for hay in the spring; (4) sorghum and cowpeas together; (5) soy beans; (6) oats, cut early and followed by velvet beans; or (7) crimson clover sowed in cotton or corn in the fall.¹

¹For information in regard to these crops write to the Secretary of Agriculture, Washington, D. C., for Farmers' Bulletins Nos. 58, 81, 89, 98, 102, and 147.

ROOT-KNOT.

An important point to consider in planning rotations is the presence of root-knot, a disease which often occurs associated with wilt on sandy soils. The cause is a minute worm or nematode (*Heterodera radicicola*), visible only by means of a microscope, that produces irregular swellings or galls on the roots of cotton, cowpeas, peaches, and many vegetables. Where this occurs, all crops subject to its attack must be avoided. The common cowpea is very susceptible to it, and when planted on infected land harbors and propagates the nematode to such an extent that following crops of cotton, etc., are greatly damaged. The cultivation of cowpeas may thus be a decided injury to land instead of a benefit. Oats is an excellent crop to starve out the nematodes, and may be followed by velvet beans, beggarweed, or corn.

ANTHRACNOSE AND BLACK-ARM.

The diseases of the limbs and bolls known as anthracnose and black-arm are caused by other parasites and should not be confused with wilt. They require different treatment, and the Centerville cotton is probably no more resistant than other varieties to these diseases.

PICKING AND HANDLING.

It is rare that sufficient care is given to the picking and handling of the Sea Island cotton grown in the interior. The highest market price can not be obtained unless the cotton is free from trash and dirt. The points most important to observe are: (1) Pick often to avoid injury by the weather; (2) sun the cotton on a low arbor after picking to dry it; (3) sort out all trash, yellow and immature cotton, etc., before ginning, as all these impurities injure the sale of the lint. On the Sea Islands the handling of the cotton is thoroughly systematized as follows: First, when the cotton is brought from the field the pickers sort it over to remove bits of leaves and bolls and all yellow and immature locks, as these latter have a weak staple and can not be used by the spinners. Then, after the cotton is sunned on an arbor, experienced hands overhaul it again on frames covered with wire netting to remove dirt and inferior cotton. After ginning, as the lint leaves the gin, it is "moted" and sorted again by two sets of hands to insure the removal of all impurities and to make the quality more uniform before baling.

If your trial of this variety results satisfactorily, save all the seed carefully, as it will be difficult to obtain more from any source. In ginning this seed care should be taken to avoid mixing with inferior cotton. Have the gins cleaned out before beginning, and catch the seeds as they come from the gin without allowing them to run through the conveyors or fall on the common pile.

SELECTION OF SEED TO MAINTAIN QUALITY.

The qualities of resistance, bearing, etc., characteristic of this cotton will be found to be thoroughly fixed in the seed distributed. It can not be expected that they will be maintained indefinitely, however, unless careful annual selection of seed is practiced. Though the Centerville variety is highly resistant to wilt, there will be occasional individuals reverting to the original type and becoming attacked by disease. All such should be weeded out and destroyed.

To keep this seed pure it is important that it should not be planted near short-staple Upland cotton, as the two species mix by pollen carried from flower to flower by bees. The result of such hybridization is the tall, barren stalks frequently seen in Sea Island fields. These are not only worthless, but injurious, as they crowd out good plants and lead to further contamination of the seed. They should therefore be destroyed whenever found. Much of the "running out" of the long-staple cotton in south Georgia is due to accidental hybridization with neighboring fields of short-staple cotton. A distance of one-quarter of a mile between fields is advised if it is desired to prevent crossing with other varieties.

To keep up the quality of this variety the adoption of a system of selection of seeds from the best plants is recommended. This is easily done by either of the two methods described below.

(1) Before picking, go over the field carefully and mark with a cloth the plants that are true to the type of the variety as regards form of plant, size, and form of bolls, productiveness, earliness, etc., with the lint long and fine and seeds well covered. Let these plants be picked separately and the seed ginned by itself. If not enough seed is obtained to plant the whole crop, use it to plant a special seed patch that will furnish seed for the main crop the next year.

(2) A better method, involving only a little more trouble, is to select from the general field a few plants of the greatest excellence, marking them with a cloth. Leave these unpicked till the middle of the season, then compare them critically with reference to bearing, length, and quality of staple, resistance to wilt, etc., and *choose from this number a single plant which combines the most desirable qualities.* Save all the seed carefully and plant separate from the main crop the next year, one seed in a hill, to secure as great a yield as possible. This cotton planted by itself each time will give sufficient seed the third year to plant the whole crop. This selection should be carried out every year. The propagation from single plants insures a uniformity that can be secured in no other way. This is the method practiced in the Sea Islands, and if it were done in Georgia and Florida there would be less trouble with the "running out" of the cotton.

REPORTS OF RESULTS.

A report on this seed is urgently desired and should cover the following points:

Character of soil, and whether or not infected with wilt and root-knot.

Character of season, size of field planted, and total yield of seed cotton as determined by actual weight.

Yield of lint, determined by weight after ginning.

Value of the variety for your section as compared with the kinds commonly grown.

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Pathologist.

Approved:

A. F. WOODS,
Pathologist and Physiologist.

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